

CLAIMS

1. A multi-speed transmission for a vehicle comprising:
 - an input shaft;
 - an output shaft;
 - 5 a plurality of planetary gear sets operatively connected between the input shaft and output shaft, each having a ring gear member, a planet carrier assembly member and a sun gear member;
 - a selectable braking one-way clutch operative to brake rotation of one of said members of said planetary gear sets when the transmission is in reverse and first
10 speed;
 - a first rotating input clutch operatively engageable with the input shaft, wherein said first rotating input clutch is slipped for launching the vehicle in first speed;
 - a second rotating input clutch operatively engageable with the input shaft, wherein said second rotating input clutch is slipped for launching the vehicle in reverse;
 - 15 and
 - wherein the transmission is characterized by the absence of a torque converter.
2. The multi-speed transmission of claim 1, wherein said first and second rotating input clutches are operatively engageable with the input shaft through one of said members of said planetary gear sets.
3. The multi-speed transmission of claim 1, wherein said input shaft is connected to a member of one of said planetary gear sets, and said first and second rotating input clutches are connected to said one of said planetary gear sets.
4. The multi-speed transmission of claim 3, wherein said input shaft is connected to the ring gear member of the first planetary gear set, and said first and

second rotating input clutches are connected to the planet carrier assembly member of the first planetary gear set.

5. The multi-speed transmission of claim 1, wherein said selectable braking one-way clutch is connected between the planet carrier assembly member of the second planetary gear set and a transmission housing.

6. The multi-speed transmission of claim 1, wherein said selectable braking one-way clutch is actuated hydraulically by a piston and valve.

7. The multi-speed transmission of claim 1, wherein said selectable braking one-way clutch is configured to freewheel in one rotational direction and to brake in an opposite rotational direction, and is selectably reversible to brake in said one rotational direction and freewheel in said opposite rotational direction, thereby
5 facilitating use in said reverse and forward speeds.

8. The multi-speed transmission of claim 1, wherein said selectable braking one-way clutch comprises a controllable overrunning coupling.

9. The multi-speed transmission of claim 1, wherein said selectable braking one-way clutch comprises a bi-directional differential clutch.

10. The multi-speed transmission of claim 1, further comprising a third clutch and a brake, and wherein said first, second and third clutches, said brake and said selectable braking one-way clutch are engageable in combinations of two to provide six forward speed ratios and one reverse speed ratio between the input shaft and the output
5 shaft.

11. The multi-speed transmission of claim 10, wherein:

said input shaft is connected to said ring gear member of the first planetary gear set;

5 said output shaft is connected to said ring gear member of the third planetary gear set;

 said first clutch is operatively connected between said planet carrier assembly member of the first planetary gear set and said sun gear member of the third planetary gear set;

10 said second clutch is operatively connected between said planet carrier assembly member of the first planetary gear set and said sun gear member of the second planetary gear set;

 said third clutch is operatively connected between the ring gear member of the first planetary gear set and said planet carrier assembly member of the third planetary gear set;

15 said brake being operatively connected between a transmission housing and said sun gear member of the first planetary gear set; and

 said selectable braking one-way clutch being operatively connected between said planet carrier assembly member of the second planetary gear set and said transmission housing.

12. A multi-speed transmission for a vehicle comprising:

 an input shaft;

 an output shaft;

5 a plurality of planetary gear sets operatively connected between the input shaft and output shaft, each having a ring gear member, a planet carrier assembly member and a sun gear member; and

a selectable (reversible) braking one-way clutch operative to brake rotation of one of said members of said planetary gear sets when the transmission is in reverse and first speed, and disengaged in all other gear states.

13. The multi-speed of claim 12, further comprising :

a first rotating input clutch operatively engageable with the input shaft, wherein said first rotating input clutch is slipped for launching the vehicle in first speed;

5 a second rotating input clutch operatively enageable with the input shaft, wherein said second rotating input clutch is slipped for launching the vehicle in reverse; and

wherein the transmission is characterized by the absence of a torque converter.

14. The multi-speed transmission of claim 13, wherein said first and second rotating input clutches are operatively engageable with the input shaft through one of said members of said planetary gear sets.

15. The multi-speed transmission of claim 13, wherein said input shaft is connected to a member of one of said planetary gear sets, and said first and second rotating input clutches are connected to said one of said planetary gear sets.

16. The multi-speed transmission of claim 15, wherein said input shaft is connected to the ring gear member of the first planetary gear set, and said first and second rotating input clutches are connected to the planet carrier assembly member of the first planetary gear set.

17. The multi-speed transmission of claim 13, wherein said selectable braking one-way clutch is connected between the planet carrier assembly member of the second planetary gear set and a transmission housing.

18. The multi-speed transmission of claim 13, wherein said selectable braking one-way clutch is actuated hydraulically by a piston and valve.

19. The multi-speed transmission of claim 13, further comprising a third clutch and a brake, and wherein said first, second and third clutches, said brake and said selectable braking one-way clutch are engageable in combinations of two to provide six forward speed ratios and one reverse speed ratio between the input shaft and the
5 output shaft.

20. A multi-speed transmission for a vehicle comprising:

an input shaft;

an output shaft;

5 a plurality of planetary gear sets operatively connected between the input shaft and output shaft, each having a ring gear member, a planet carrier assembly member and a sun gear member;

a selectable braking one-way clutch operative to brake rotation of one of said members of said planetary gear sets when the transmission is in reverse and first
10 speed;

a first rotating input clutch operatively engageable with the input shaft, wherein said first rotating input clutch is slipped for launching the vehicle in first speed;

a second rotating input clutch operatively enageable with the input shaft, wherein said second rotating input clutch is slipped for launching the vehicle in reverse;

15 a third clutch and a brake, and wherein said first, second and third clutches, said brake and said selectable braking one-way clutch are engageable in

combinations of two to provide six forward speed ratios and one reverse speed ratio between the input shaft and the output shaft; and

wherein the transmission is characterized by the absence of a torque

20 converter.